

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Original). A data processing apparatus operable to form a reduced-bandwidth-version of an original material item, the reduced-bandwidth-version including a code word from a predetermined set of code words, and an impaired version of the material item from which a marked representation of the original material item can be formed, wherein the impaired version is formed by removing the reduced-bandwidth-version of the material item from a copy of the original material item.

Claim 2 (Currently Amended). A data processing apparatus as claimed in claim 1, comprising:

a first bandwidth processor operable to form the reduced-bandwidth-version of the original material item, the bandwidth reduction occurring in at least one of the temporal or spatial domains,

an encoding processor operable to form the marked reduced-bandwidth-version of the original material item by combining the code word with the reduced-bandwidth-version of the original material item, and

a material adaptation processor operable to form an impaired version of the original material item by subtracting the reduced-bandwidth-version of the material item from the original material item.

Claim 3 (Currently Amended). A The data processing apparatus as claimed in claim 2, further comprising:

a second adaptation processor operable to up-convert the reduced-bandwidth-version of the original material item in accordance with the bandwidth reduction performed by the

first bandwidth adaptation processor, the bandwidth of the up-converted reduced band width version corresponding to that of the original material item, and the material adaptation processor is operable to subtract the up-converted reduced-bandwidth-version from the copy of the original material item.

Claim 4 (Currently Amended). A The data processing apparatus as claimed in claim 2, further comprising:

a data storage means operable to store the marked reduced-bandwidth-version and the impaired version of the material item individually.

Claim 5 (Currently Amended). A The data processing apparatus as claimed in claim 4, wherein the data storage means stores a plurality of encrypted marked reduced-bandwidth-versions of the material item ~~are stored~~ with the impaired material item on a storage medium.

Claim 6 (Currently Amended). A The data processing apparatus as claimed in claim 3, further comprising wherein means for storing the marked reduced-bandwidth-version and the impaired version of the material item ~~are stored~~ on separate media.

Claim 7 (Currently Amended). A The data processing apparatus as claimed in claim 1, further comprising:

a data communications apparatus operable to communicate the marked reduced-bandwidth-version and the impaired version of the material item separately.

Claim 8 (Currently Amended). A The data processing apparatus as claimed in claim 7, wherein the data communications apparatus transmits the impaired version of the material

item ~~is transmitted~~ via a data communications network, and the data communications apparatus distributes the reduced-bandwidth-version ~~is distributed~~ via a data carrier.

Claim 9 (Currently Amended). A The data processing apparatus as claimed in claim 7, wherein the data communications apparatus distributes the impaired version of the material item ~~is distributed~~ via a data carrier, and the data communications apparatus transmits the reduced-bandwidth-version ~~is transmitted~~ via a data communications network.

Claim 10 (Currently Amended). A The data processing apparatus as claimed in claim 2, wherein the encoding processor is operable to adapt coefficients of the code word with respect to the samples of the reduced-bandwidth-version of the material item to which the code word coefficients are to be combined, wherein the adaptation of the code word coefficients with respect to the reduced-bandwidth-version is made to the effect of reducing a likelihood of detection of the code word in the marked representation of the material item.

Claim 11 (Currently Amended). A The data processing apparatus as claimed in claim 2, wherein the bandwidth reduction processor comprises a temporal sub-sampler operable to form the reduced-bandwidth-version of the material item in the time domain.

Claim 12 (Currently Amended). A The data processing apparatus as claimed in claim 11, wherein the temporal sub-sampler comprises a low-pass filter in combination with a sample selector operable to selectively sample the material item after low-pass filtering.

Claim 13 (Currently Amended). A The data processing apparatus as claimed in claim 1, wherein the bandwidth reduction processor comprises a spatial sub-sampler operable to

form the reduced-bandwidth-version of the material item.

Claim 14 (Currently Amended). A The data processing apparatus as claimed in claim 13, wherein the spatial sub-sampler comprises a low pass filter and a sample selector operable to select predetermined samples with respect to a spatial reference after low pass filtering.

Claim 15 (Currently Amended). A The data processing apparatus as claimed in claim 14, wherein the sample selector comprises a wavelet transform processor operable to form a wavelet transform of the material item and to select one of a plurality of sub-bands of the wavelet transform to form the reduced-bandwidth-version of the material after low pass filtering, the wavelet transform sub-bands providing the spatial reference

Claim 16 (Currently Amended). A The data processing apparatus as claimed in claim 2, wherein the encoding processor comprises a code word generator operable to generate the code word using a pseudo-random number generator initialised with a seed value uniquely associated with the code word, the code word coefficients being formed from numbers generated by the pseudo-random number generator.

Claim 17 (Currently Amended). A The data processing apparatus as claimed in claim 16, wherein the encoding processor comprises

a discrete cosine transform processor operable to transform the reduced-bandwidth-version of the material item into the discrete cosine transform domain, the reduced-bandwidth-version of the material item in the discrete cosine transform domain being represented as a plurality of discrete cosine transform coefficients, wherein the encoding

processor is operable to combine the code word with the material item by adding each of the code word coefficients to a corresponding one of the discrete cosine transform coefficients, and

an inverse discrete cosine transform processor operable to form the marked reduced-bandwidth-version of the material item by performing an inverse discrete cosine transform on the discrete cosine transformed reduced-bandwidth-version to which the code word has been added by the encoding processor.

Claim 18 (Withdrawn). A reproducing apparatus for reproducing a representation of an original material item from a reduced-bandwidth-version of the material item marked with a code word from a predetermined set of code words and an impaired version of the material item, from which a marked representation of the original material item can be formed, the apparatus comprising

a receiver operable to receive the impaired version of the material item, and to receive the marked reduced-bandwidth-version of the original material item, and

a combiner operable to combine the marked reduced-bandwidth-version of the material item with the impaired version to reproduce a representation of the original material item.

Claim 19 (Withdrawn). A cinema projector including a reproducing apparatus according to claim 18, wherein the material is at least one of audio signals and image signals, said projector including a projection processor operable to project the representation of the original material item reproduced by the reproducing apparatus.

Claim 20 (Withdrawn). A web server operable to provide material items for

downloading via the Internet, the web server including a reproducing apparatus according to claim 18, wherein the reproducing apparatus is operable to combine the marked reduced-bandwidth-version of the material item with the impaired version before the material items are downloaded.

Claim 21 (Currently Amended). A The web server including a data processing apparatus as claimed in claim 1, operable to form an impaired version of a material item formed by subtracting a reduced-bandwidth-version from the material item, the web server being arranged to provide access to the impaired version via the Internet, Intranet, Extranet or Private IP network and to provide the reduced-bandwidth-version of the material item marked with a code word which identifies a version of the material item formed by combining the impaired material item with the marked-reduced-bandwidth version of the material item.

Claim 22 (Withdrawn). A display device including a reproducing apparatus according to claim 18, wherein the material is at least one of audio signals and image signals, the display device being operable to display the representation of the original material item reproduced by the reproducing apparatus on the display screen.

Claim 23 (Currently Amended). A The distribution system including a data processing apparatus as claimed in claim 1 operable to form an impaired version of a material item formed by subtracting a reduced-bandwidth-version of the material item from the original material item, the distribution system being arranged to provide access to the impaired version and to distribute to users on demand the reduced-bandwidth-version of the material item marked with a code word which identifies a version of the material item distributed to each user, the code word being arranged to identify the version of material item

formed by combining the impaired material item with the marked-reduced-bandwidth version of the material item.

Claim 24 (Withdrawn). A detecting data processing apparatus operable to determine whether one or more code words of a predetermined set of code words is present in a suspected marked version of a material item, the suspected version having been assumed to have been formed by combining each of a plurality of samples of a reduced-bandwidth-version of the original material item with one of a corresponding plurality of code word coefficients, said apparatus comprising a bandwidth processor operable to form a reduced-bandwidth-version of a copy of the original material item and a reduced-bandwidth-version of the suspected version of the material, or a reduced-bandwidth-version of a difference between the original and suspect material items, the bandwidth reduction being arranged to isolate the part of the bandwidth of the material to which the code word may have been combined, a recovery processor operable to generate a recovered code word by comparing corresponding samples of the marked-reduced-bandwidth material item with the samples of the copy of the material item, a correlation processor operable to generate, for each of the code words in the predetermined set of code words a correlation value by correlating the recovered code word with each of the generated code words, and a detection processor operable to detect one or more code words from the correlation value for the code word exceeding a predetermined threshold.

Claim 25 (Withdrawn). A detecting data processing apparatus as claimed in claim 24, wherein the correlation processor includes a code word generator operable to generate pseudo-random numbers from which said regenerated code word coefficients are formed, the pseudo-random numbers being generated from a seed value uniquely associated with said

code word.

Claim 26 (Withdrawn). A detecting data processing apparatus as claimed in claim 25, wherein the seed value is formed from the samples of the marked material item.

Claim 27 (Withdrawn). A detecting data processing apparatus as claimed in claim 24, wherein the code word has been introduced into the reduced-bandwidth-version of the material item in the discrete cosine transform domain, the apparatus comprising a discrete cosine transform processor operable to transform the suspected reduced-bandwidth-version of the material item and the reduced-bandwidth-copy of the original material item into the discrete cosine transform domain, wherein the recovery processor is operable to generate the recovered code word by subtracting corresponding discrete cosine transform coefficients of the original material version from discrete cosine transform coefficients of the marked material version.

Claim 28 (Currently Amended). A system for identifying the recipient of a material item, the system comprising:

a data processing apparatus operable to form a reduced-bandwidth-version of an original material item, the reduced-bandwidth-version including a code word from a predetermined set of code words, and an impaired version of the material item from which a marked representation of the original material item can be formed, wherein the impaired version is formed by removing the reduced-bandwidth-version of the material item from a copy of the original material item,



a reproducing apparatus for reproducing a representation of said original material item from said reduced-bandwidth-version marked with a code word, said reproducing apparatus comprising

a receiver operable to receive the impaired version of the material item, and to receive the marked reduced-bandwidth-version of the original material item, and

a combiner operable to combine the marked reduced-bandwidth-version of the material item with the impaired version to reproduce a representation of the original material item, and

a detecting data processor according to Claim 24, operable to detect with a predetermined false positive probability the recipient by detecting the presence or absence of the code word in the material.

Claim 29 (Currently Amended). A method of processing an original material item, comprising:

forming a reduced-bandwidth-version of the material item marked with a code word from a predetermined set of code words, and

forming an impaired version of the material item from which a marked representation of the original material item can be formed.

Claim 30 (Currently Amended). A The method of processing as claimed in claim 29, wherein the forming a reduced-bandwidth-version of an original material item, comprises forming the bandwidth reduction in at least one of temporal or spatial domains, and

combining the code word with the reduced-bandwidth-version of the original material item, and the forming the impaired version of the original material item comprises

subtracting the reduced-bandwidth-version of the material item from the original material item.

Claim 31 (Withdrawn). A method of determining whether one or more code words of a predetermined set of code words is present in a suspected marked version of a material item, the suspected version having been assumed to have been formed by combining each of a plurality of samples of a reduced-bandwidth-version of the original material item with one of a corresponding plurality of coefficients of the code word, the method comprising forming a reduced-bandwidth-version of a copy of the original material item and a reduced-bandwidth-version of the suspected version of the material, or a reduced-bandwidth-version of a difference between the original and suspect material items, the bandwidth reduction being arranged to isolate the part of the bandwidth of the material to which the code word may have been combined, generating a recovered code word by comparing corresponding samples of the marked-reduced-bandwidth material item with the samples of the copy of the material item, and generating, for each of the code words in the predetermined set of code words a correlation value by correlating the recovered code word with each of the generated code words, and detecting one or more code words from the correlation value for the code word exceeding a predetermined threshold.

Claim 32 (Original). A data signal representing an impaired material item or a reduced-bandwidth-version of the material item to which a code word has been embedded, as produced by the data processing apparatus according to claim 1.

Claim 33 (Currently Amended). A ~~data carrier~~ computer readable medium having recorded thereon a data signal ~~according to claim 32, representing an impaired material item~~

or a reduced-bandwidth-version of the material item to which a code word has been embedded, as produced by the data processing apparatus according to claim 1.

Claim 34 (Currently Amended). A computer readable medium encoded with a computer program providing computer executable instructions, which when loaded onto a data processor configures the data processor to operate as a data processing apparatus according to claim 1.

Claim 35 (Withdrawn). A computer program providing computer executable instructions, which when loaded onto a data processor configures the data processor to operate as a detecting data processor according to claim 24.

Claim 36 (Currently Amended). A computer readable medium encoded with a computer program providing computer executable instructions, which when loaded on to a data processor causes the data processor to perform the method according to claim 29.

Claim 37 (Cancelled).

Claim 38 (Withdrawn). A computer program product having a computer readable medium having recorded thereon information signals representative of the computer program claimed in claim 35.

Claim 39 (Original). A computer program product having a computer readable medium having recorded thereon information signals representative of the computer program claimed in claim 36.

Claim 40 (Original). A data carrier bearing an impaired material item and a plurality of a reduced-bandwidth-versions of the material item to which watermark code words have been added, as produced by the data processing apparatus according to claim 1, wherein the marked reduced-bandwidth-versions are encrypted.

Claim 41 (Currently Amended). An apparatus for processing an original material item, comprising:

means for forming a reduced-bandwidth-version of the material item marked with a code word from a predetermined set of code words, and means for forming an impaired version of the material item from which a marked representation of the original material item can be formed.

Claim 42 (Currently Amended). ~~An~~ The apparatus for processing as claimed in claim 41, wherein the means for forming a reduced-bandwidth-version of an original material item, comprises means for forming the bandwidth reduction in at least one of temporal or spatial domains, and means for combining the code word with the reduced-bandwidth-version of the original material item, and the means for forming the impaired version of the original material item comprises means for subtracting the reduced-bandwidth-version of the material item from the original material item.

Claim 43 (Withdrawn). An apparatus for determining whether one or more code words of a predetermined set of code words is present in a suspected marked version of a material item, the suspected version having been assumed to have been formed by combining each of a plurality of samples of a reduced-bandwidth-version of the original material item

with one of a corresponding plurality of coefficients of the code word, the apparatus comprising means for forming a reduced-bandwidth-version of a copy of the original material item and a reduced-bandwidth-version of the suspected version of the material, or a reduced-bandwidth-version of a difference between the original and suspect material items, the bandwidth reduction being arranged to isolate the part of the bandwidth of the material to which the code word may have been combined, means for generating a recovered code word by comparing corresponding samples of the marked-reduced-bandwidth material item with the samples of the copy of the material item, and means for generating, for each of the code words in the predetermined set of code words a correlation value by correlating the recovered code word with each of the generated code words, and means for detecting one or more code words from the correlation value for the code word exceeding a predetermined threshold.